

REMARKS

Claims 1-3 and 6-12 are pending. By this Amendment, claims 1 and 7 are amended.

A Restriction and an Election of Species Requirement was asserted and Applicants elected Group I and Fig. 9. Claims 1-3 and 7-12 read on the elected group and species. Applicants request rejoinder of claim 6 when claim 1 is allowed because claim 1 remains generic to claim 6.

A substitute Declaration was filed on March 8, 2007.

Claim 7 was objected to and has been amended responsive to the objection. It is respectfully requested that the objection be withdrawn.

Applicants appreciate the allowance of claims 7-12.

Claims 1-3 were rejected under 35 U.S.C. §103(a) over JP-A-9-097637 (JP '637) in view of Kimura et al. (Kimura), U.S. Patent No. 5,786,304, and Maeda et al., (Maeda) U.S. Patent No. 6,235,685. The rejection is respectfully traversed.

Claim 1 calls for a volume of holes in the joining metal provided at the joint portions to be 5% or less of a volumetric capacity of the joint portions, and a current resistance value to be 0.5 $\mu\Omega$ or less when a current of 1000A is flown. The combination of JP '637, Kimura and Maeda fails to suggest these features.

Page 4 of the Office Action states that JP '637 discloses the holes in the joining metal provided at the joint portions as called for by claim 1. In particular, the Office Action states that JP '637 discloses a joint that is formed with a low contact resistance, the holes formed by the entrapped gas at the joint will increase the resistance, and that the low contact resistance of JP '637 implies that there is a minimum amount of entrapment of the gas or almost no gas holes formed at all. In addition, the Office Action states that the existence of holes will reduce the mechanical strength at the joint. From this point of view, the Office Action

concludes by stating that it would have been obvious to a person of ordinary skill in the art to reduce the holes at the joining metal.

Applicants do not agree because one skilled in the art would not recognize that there are holes that are formed in the joining metal between an oxide superconductor and a metal and because one skilled in the art cannot easily estimate the holes.

As previously argued, if a conductive current of about 200A is used in JP '637, a resistance value shows a sufficiently low value even if not taking into consideration the holes formed in the joining metal portion. This is because, from the property of a superconducting phenomenon, current flows through the joint portion in the superconducting state, if there is at least a part of a connection in a superconducting state. Accordingly, it can not be considered that JP '637, wherein the conductive current is 200A at most, could further consider or recognize this joining metal. Actually, JP '637 describes neither holes formed in the joining metal nor the joining metal. Namely, it appears that if one skilled in the art can not consider the existence of the holes of the joining metal, one skilled in the art cannot conceive reducing the resistance by reducing the holes.

Meanwhile, when the joint portions of an oxide superconducting current lead is observed from the viewpoint of mechanical strength, these joint portions are designed so that no mechanical stress applied thereto. Namely, the mechanical strength is not required in these joint portions. In fact, JP '637 does not describe the mechanical strength of the joint portion between the oxide superconductor and the metal. Namely, the mechanical strength in the joint portion between the oxide superconductor and the metal is not taken into consideration by one skilled in the art. As a result, one skilled in the art could not possibly consider the existence of the holes of the joining metal and conceive of securing the mechanical strength of this part by reducing these holes.

In addition, from the time when a rare earth oxide superconductor was found in 1987 until this application was filed, there is no document referring to the holes of the joint portion between the oxide superconductor and the metal. This is paradoxical proof that there is absolutely no concept that the holes exist in the joint portions for one skilled in the art.

In an effort to expedite prosecution, Applicants further clarify that a current resistance value is $0.5\ \mu\Omega$ or less when a current of 1000A is flown as recited in claim 1 and as supported by Applicants' specification. The Applicants flow the current of 1000A or more through the superconducting current lead and achieves the knowledge or the existence of the holes in the joining metal. Then, the Applicants determine the cause of the increase of the resistance value, and achieves the knowledge that the holes exist in the joining metal. Then, a resistance value of $0.5\ \mu\Omega$ or less is realized while flowing the current of 1000A through the current lead, by reducing the existence of the holes of this joining metal to 5% or less.

As described above, it is not apparent to one skilled in the art that the holes are formed in the joining metal between the oxide superconductor and the metal. Still more, by suppressing these holes to 5% or less, the resistance value of $0.5\ \mu\Omega$ or less is realized while flowing the current of 1000A through the current lead. Therefore, combination of features recited in claim 1 are not disclosed or suggested by the combination of JP '637, Kimura and Maeda.

It is respectfully requested that the rejection be withdrawn.

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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